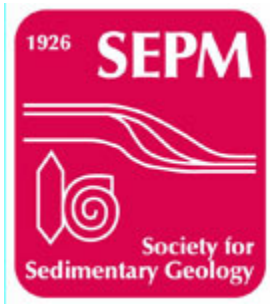

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THE GASTROPOD GENUS *CERATOSTOMA*

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ABSTRACT—The species belonging to the genus *Ceratostoma* are listed and some are figured, as are forms that closely resemble the genus. The genus is characterized by three varices, foliations on the varices, and a tooth on the anterior portion of the outer lip. The genus *Ceratostoma* lives in a littoral marine environment with water temperatures ranging from 2 to 27 degrees Centigrade. Known time range of the genus is from the Middle Miocene to the Recent.

INTRODUCTION

THE genus *Ceratostoma* was first recognized in 1784 by Martyn, under the name *Purpura*. The International Commission on Zoological Nomenclature in Opinion 456, dated 15 March 1957, has rejected Martyn's work as not available. Hence an alternative name—*Ceratostoma*—for this distinctive gastropod group has been employed and most of the species that comprise the genus are listed.

As some paleontologists and malacologists have confused the genera *Pterorhytis*, *Pterynotus*, and *Ocinebrellus* with *Ceratostoma*, they are figured here with fossil and living species of *Ceratostoma* in order to clearly show differences.

This shallow water genus has certain characteristics that are always common to the species, but there are striking differences between two taxa—these two may constitute separate subgenera. One subgenus would include *C. nuttalli*, *C. fournieri*, *C. rorifluum*, and *C. monoceros;* and the other would include *C. foliatum*, *C. burnetti*, *C. delorae*, *C. nanna*, *C. perangulatum*, *C. turris*, *C. plorator*, and *C. esychus*. Several members of the first group mentioned can tolerate water no colder than 13 or 14°C., the latter water as cold as 2°C. and no warmer than 19°C.

SYNONYMY

In 1837, Conrad (p. 263) published the generic name *Cerostoma*, the type species by monotypy being *Cerostoma nuttalli*. However, *Cerostoma* must be rejected under the Law of Homonymy in favor of *Cerostoma* Latreille (1802, p. 416), which is an insect Herrmannsen (1846, p. 206), emended the name *Cerastoma* Conrad—under the mistaken impression that this was Conrad's spelling—to *Ceratostoma* in a nomenclator as follows: "*Rectius Ceratostoma vel Cerostoma.*" *Cerastoma* cannot be recognized as an emendation, for that name is also preoccupied (Koch, 1839, p. 29).

In a petition before the International Commission of Zoological Nomenclature I have asked:

1) To validate the generic name *Ceratostoma* Herrmannsen, 1846, even though that name was published in a nomenclatorial index.

2) To place the name *Ceratostoma* on the Official List of Generic Names in Zoology.

3) To place the under-mentioned name on the Official List of Specific Names in Zoology:

nuttalli Conrad, 1837. The type species (by monotypy) of the genus *Ceratostoma*.

4) To place the under-mentioned generic names on the Official Index of Rejected and Invalid Generic Names in Zoology:

a) *Cerostoma* Conrad, 1837 [a homonym of *Cerostoma* Latreille (1802), Insecta].

b) *Cerastoma* Herrmannsen, 1846 (an erroneous subsequent spelling of *Cerostoma*) [a homonym of *Cerastoma* Koch (1839), Arachnida].

SYSTEMATICS

Family MURICIDAE

Genus CERATOSTOMA Herrmannsen, 1846

"*Purpura* Martyn, 1784" of authors (non-binomial).

Cerostoma Conrad, 1837, p. 263, (not *Cerostoma* Latreille, 1802, p. 416, Insecta).
Ceratostoma Herrmannsen, 1846, p. 206 (emendation of *Cerastoma*, spelling error for *Cerostoma*).

Type.—*Cerostoma nuttalli* Conrad, 1837, by monotypy.

The genus is characterized by three varices (except in *C. rorifluum*, which has four), foliations on the varices, and a tooth on the anterior portion of outer lip.

CERATOSTOMA NUTTALLI (Conrad, 1837)
Pl. 1, figs. 1,2,8; 3,4,12

Murex (*Cerostoma*) *nutalli*, Conrad, 1837, p. 264, pl. 20, fig. 22.
Murex nuttalli Conrad, Sowerby, 1880, p. 27.
Cerostoma nuttalli Conrad, Cooper, 1888, p. 233.
Murex (*Pterorhytis*) *nuttalli* Conrad, Arnold, 1903, p. 245.
Purpura nuttalli albescens Dall, 1919, p. 332; 1921, p. 107; Oldroyd, 1927, p. 14.
Purpura nuttalli Dall, 1921, p. 107; Jordan, 1926, p. 245; Grant and Gale, 1931, p. 705.

Hypotype.—Univ. of Calif. at Los Angeles Cat. Nos. 28994 and 28995.

Type locality.—Santa Barbara, California, Recent. (Type specimen at the Acad. Nat. Sci. Philad.).

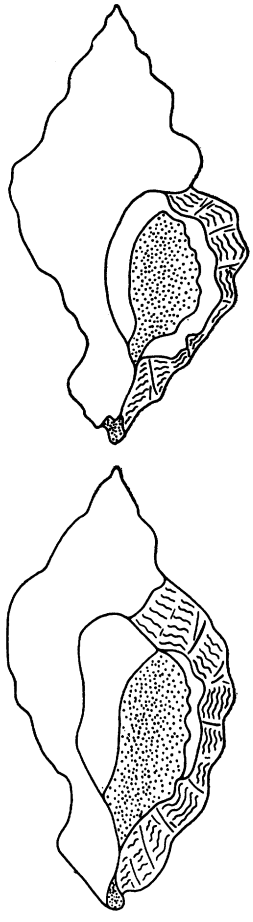
Distribution.—Pleistocene: Rare in Pleistocene fauna at Deadman Island; Pleistocene at San Quintin Bay, Lower Calif. Mexico.

Recent: Scammon's Lagoon, Lower California, to Montery Bay, Calif. (27 to 37 degrees Latitude). Living in water with an approximate temperature of 13 to 22 degrees Centigrade. This is a shallow water or littoral form living at depths of between 0 and 20 fathoms.

Remarks.—Commonly not as frilled as *C. foliatum*, and with teeth on inside of outer lip. *C. nuttalli* has a smaller thorn-like tooth on outer lip than *C. monoceros*, *C. monoceras* slightly higher spired than *C. nuttalli*, and with a more distinct shoulder (see Text-fig. 1).

CERATOSTOMA MONOCEROS (Sowerby, 1841)
Pl. 2, figs. 4–6

Murex monoceros Sowerby, 1841, p. 143; 1841, p. 5, figs. 64,65; Kiener, p. 28, pl. 10, fig. 86. [Not *Murex monoceros* d'Orbigny, p. 454, pl. 78, figs. 1,2.]
Murex (*Cerostoma*) *monoceros* Sowerby, Tryon, 1880, p. 115, pl. 35, figs. 388,389.
Murex (*Pterorhytis*) *monoceros* Sowerby, Arnold, 1903, p. 246.



TEXT-FIG. 1—Differences in outline between *Ceratostoma monoceros* (top) and *C. nuttalli* (bottom).

Purpura monoceros Sowerby, Stewart, 1927, p. 388, pl. 32, fig. 1.

Hypotype.—Calif. Acad. Sci. Dept. Paleo. type coll. no. 9507.

Type locality.—Lower California, Mexico, Recent.

Distribution.—Pleistocene: Santa Barbara formation; San Pedro formation; San Diego formation.

Recent: Lower California, Mexico. Living in water between 14 and 24 degrees Centigrade.

CERATOSTOMA FOURNIERI (Crosse, 1861)
Pl. 1, figs. 5–7

Murex fournieri Crosse, 1861, p. 352, pl. 16, fig. 7.

Hypotype.—Stanford Univ. Paleo. Type Coll. no. 8493.

Type locality.—Japanese waters 13–27°C. Recent.

CERATOSTOMA RORIFLUUM (Adams & Reeve, 1850)
Pl. 1, figs. 9–11

Murex rorifluus Adams & Reeve, p. 38.
Murex monachus Crosse, 1862, p. 55. pl. 1, fig. 9.

Hypotype.—Stanford Univ. Paleo. Type Coll. No. 8494.

Type locality.—Japanese waters 6–27°C.; Recent.

Remarks.—Weak tooth, more clearly seen on older varices, smoother shell than *C. nuttalli*, 4 varices.

CERATOSTOMA FOLIATUM (Gmelin, 1791)
Pl. 1, figs. 13–15; Pl. 4,5,7

Purpura foliata Martyn, 1784, pl. 66 (non-binomial); Dall, 1921, p. 106; Oldroyd, 1927, p. 14; Grant & Gale, 1931, p. 705.
Murex foliatus Gmelin, 1791, p. 3529; Reeve, 1845, pl. 3, fig. 12.
Murex foliatus Martyn, Sowerby, 1880, p. 24, pl. 11, fig. 110.
Murex (Cerostoma) foliatus Martyn, Tryon, 1880, p. 113, pl. 34, figs. 370,371.
Murex (Pterorhytis) foliatus Martyn, Arnold, 1903, p. 245.
Murex phyllopterus Lamarck, Sowerby, 1834; 1880, p. 24, fig. 107.
Purpura perponderosa Dall, 1922, p. 46, pl. 2, figs. 2,5; Howe, 1922, p. 93.

Hypotype.—Univ. of Calif. at Los Angeles, Invert. Paleo. Cat. nos. 21851 and 28997.

Type locality.—Sitka, Alaska; Recent.

Distribution.—Recent: San Diego to Sitka Alaska. Living in waters ranging from approximately 2 to 19 degrees Centigrade and at depths of approximately 30 fathoms or less.

Remarks.—The varices of the Alaskan forms are usually larger and more curved than those farther south.

CERATOSTOMA BURNETTI (Adams & Reeve), 1850)
Pl. 3, figs. 2,4,6

Murex burnetti Adams & Reeve, 1850, p. 38, pl. 8, figs. 4a,4b.
Murex coreanicus Adams, 1853, p. 72.

Hypotype.—Stanford Univ. Paleo. Type Coll. no. 8495.

Type locality.—Japanese waters 3–27°C.; Recent.

Remarks.—Similar to *C. foliata* but sculpture between varices not as strong, older whorls more rounded, and tooth slightly larger.

CERATOSTOMA DELORAE Hall, 1958
Pl. 3, figs. 8–10

Ceratostoma delorae Hall, 1958.

Description.—Shell heavy, with three whorls and three prominent thick varices continuous from body whorl to spire; aperture ovate; spire low, with indistinct suture; spiral sculpture consisting of 7 distinct and 2 indistinct slightly nodose ribs on the body whorl, with 2 ribs on the penultimate whorl; axial sculpture faint.

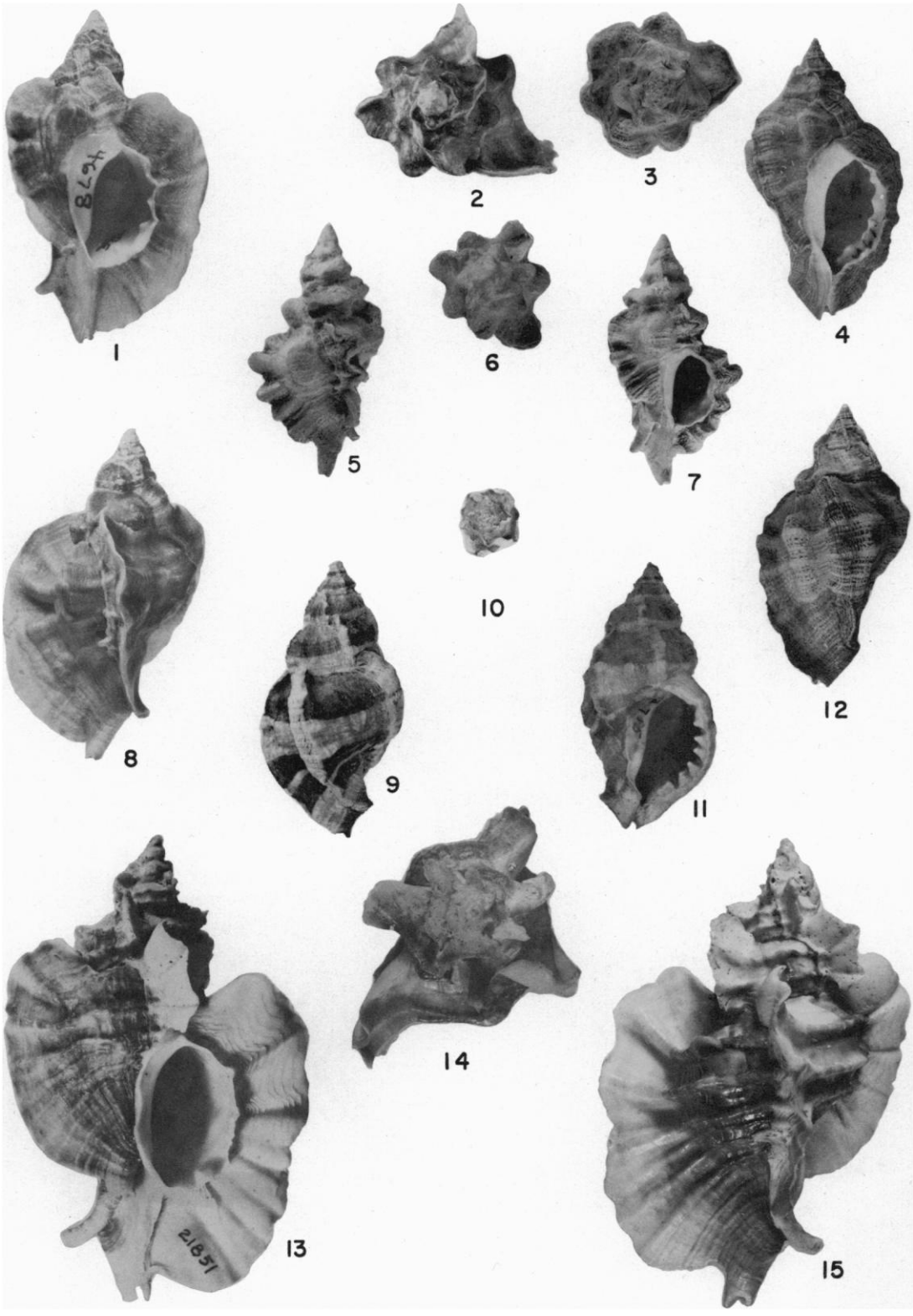
Dimensions.—Height, 62 mm.; width, 38 mm.

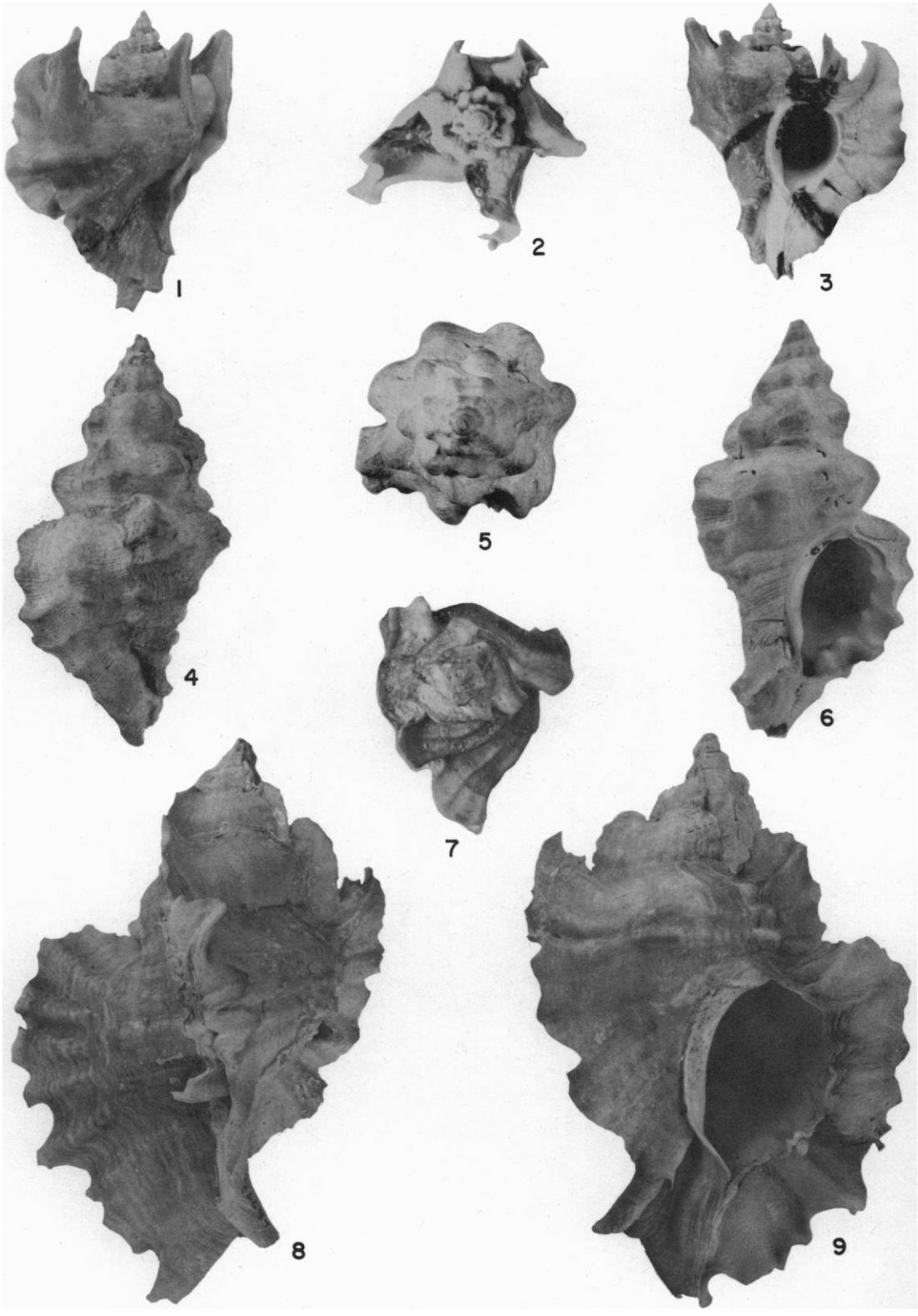
Holotype.—Stanford University Type Coll. no. 8473.

Occurrence.—L.S.J.U. loc. 3245. Oursan sandstone, Middle Miocene.

EXPLANATION OF PLATE 61
All figures ×1, except Fig. 10, which is ×½

FIGS. *1,2,8—Ceratostoma nuttalli* (Conrad). UCLA Hypotype Cat. no. 28995. Southern California, Recent.
3,4,12—Ceratostoma nuttalli (Conrad). UCLA Hypotype Cat. no. 28994. Southern California, Recent.
5–7—Ceratostoma fournieri (Crosse). Stanford Univ. Paleo. Type Coll. Hypotype no. 4893. Japan, Recent.
9–11—Ceratostoma rorifluum (Adams and Reeve). Stanford Univ. Paleo. Type Coll. Hypotype no. 8494. Japan, Recent.
13–15—Ceratostoma foliatum (Gmelin). UCLA Hypotype Cat. no. 21851. Howkan, Alaska: Recent.





Remarks.—The age range of *Ceratostoma* has previously been from Upper Miocene (?) or Pliocene to Recent. This species is from Middle Miocene rocks and thus constitutes an extension of the time range for the genus. Since the present day forms that most closely resemble *C. delorae* range northward to Alaska, the implication is that these forms have adapted to relatively cool water through geologic time.

CERATOSTOMA NANNA (Nomland, 1917)

Purpura nanna Nomland, 1917, p. 310, pl. 19, figs. 1a,b; Grant & Gale, 1931, p. 706.

Type locality.—North of Coalinga, California, Miocene.

Type specimen. No. 11315, Univ. Calif. at Berkeley type collection. Upper Miocene, Santa Margarita formation

Remarks.—"This species resembles somewhat closely *Purpura foliata* Martyn: but has a more elongated form, stronger nodes between the varices, a development of fine threadlets between the spiral cords, and the varix on the front side of body whorl projects forward, thus not having the flattened appearance evident on a front view of *Purpura foliata Martyn.*" (Nomland, 1917 p. 310)

CERATOSTOMA PERANGULATUM (Nomland, 1916)

Murex perangulatus Nomland, 1916, p. 206, pl. 11, figs. 1a,b.

Type locality.—Univ. Calif. at Berkeley, locality 2649, west of Coalinga, Calif.; Pliocene.

Type specimen.—In the University of California at Berkeley collection. Etchegoin-Jacalitos formations, Pliocene.

Remarks.—Resembles *C. foliatum*, but is lower spired and has an open canal.

CERATOSTOMA TURRIS (Nomland, 1916)

Purpura turris Nomland, 1916, p. 86, pl. 7, fig. 4.

Type locality.—West of Coalinga at the Univ. of Calif. at Berkeley locality no. 2110, Pliocene.

Type specimen.—At the Univ. of Calif. at Berkeley. From the Etchegoin formation of Pliocene age.

Remarks.—Not as high spired as *C. foliatum*, open canal, ribs on body whorls not as distinct as *C. foliatum.*

CERATOSTOMA PLORATOR (Adams & Reeve, 1850)

Murex plorator, Adams & Reeve, p. 38; Sowerby, p. 25, pl. 10, fig. 89.

Type locality.—Japanese waters 13–27°C., Recent.

CERATOSTOMA ESYCHUS (Dall, 1925)

Murex (Pteropurpura) esychus Dall, 1925, p. 21, pl. 32, fig. 9, pl. 33, fig. 6.

Type locality.—Japanese waters 15–27°C., Recent.

OTHER GENERA

The following genera have at times been confused with the genus *Ceratostoma* and are included to make clear differences.

PTERORHYTIS Conrad, 1868

Pterorytis Conrad, 1862, p. 560; *Pterorhytis* Conrad, 1868, p. 64.

Type.—*Murex umbrifer* Conrad, 1832, by monotypy.

Genus characterized by 4 to 6 varices, foliations on the varices, and a tooth on the anterior portion of the outer lip. Canal completely roofed over.

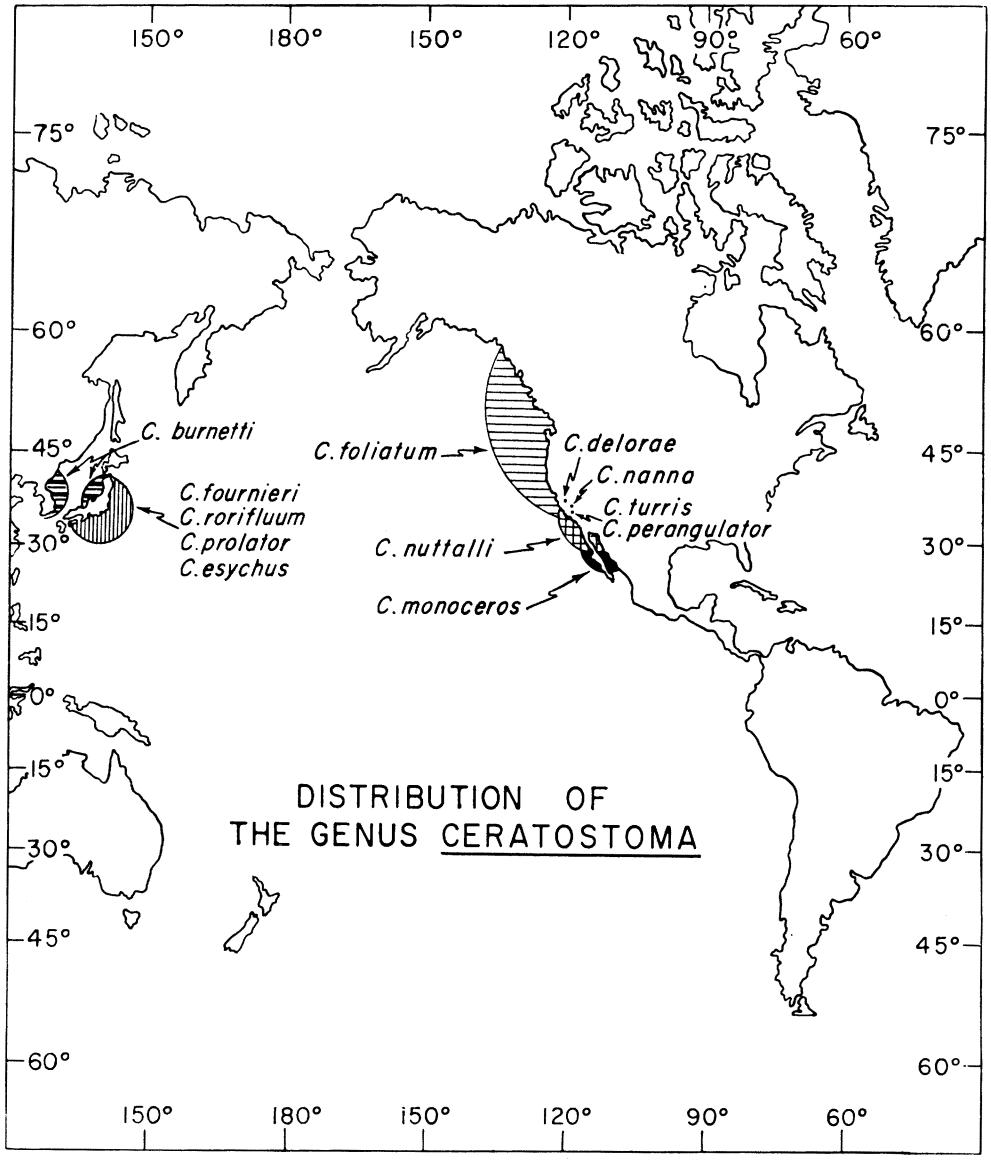
EXPLANATION OF PLATE 62

All figures ×1, except Fig. 7, which is ×½.

FIGS. *1–3*—*Ocinebrellus aduncus* (Sowerby). UCLA Hypotype Cat. no. 28998. Kii, Japan; Recent. At a depth of 30 fathoms.

4–6—*Ceratostoma monoceros* (Sowerby). Calif. Acad. Sci. Dept. Paleo. Type Coll. no. 9507. San Ignacio Lagoon, Lower California; Recent.

7–9—*Ceratostoma burnetti* (Adams & Reeve). Stanford Univ. Paleo. Type Coll. Hypotype no. 8495. Japan, Recent.



TEXT-FIG. 2

PTERORHYTIS UMBRIFER Conrad, 1868
Pl. 3, fig. 6

Pterorhytis umbrifer Conrad, 1868, p. 64.

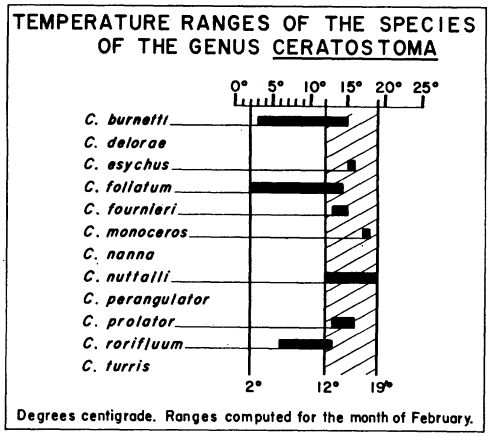
Type locality.—York Town, Virginia
Distribution.—Virginia, Miocene.
Remarks.—4 to 6 varices. Figured by A. Olsson & A. Harbison in Acad. Nat. Sci. Philad. Mono. 8, p. 252, pl. 35, fig. 2.

OCINEBRELLUS Jousseaume, 1880

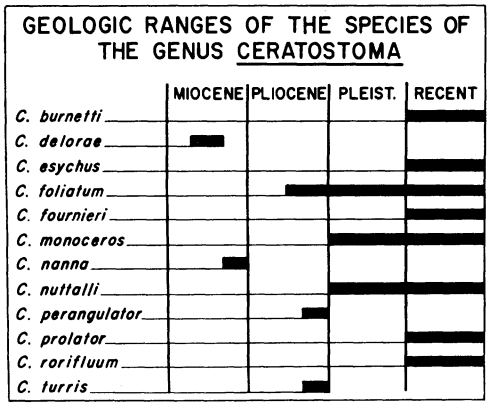
Ocinebrellus, Jousseaume, 1880, p. 355.

Type.—*Murex eurypteron* Reeve, 1845, by original designation. Genus characterized by 4 to 5 varices, and lack of tooth on outer lip, curved varices.

OCINEBRELLUS ADUNCUS (Sowerby, 1834)
Pl. 2, figs. 1–3



TEXT-FIG. *3*



TEXT-FIG. *4*

Murex aduncus Sowerby, 1834, p. 62, fig. 35.
Ceratostoma aduncа Sowerby, Hirase, 1954, pl. 109, fig. 11.

Hypotype.—Univ. of Calif. at Los Angeles Invert. Paleo. Cat. No. 28898.

Type locality.—Japan. Recent.

Remarks.—Other *Ocinebrellus* include the species *O. eurypteron* (Reeve, 1845) and *O. falcatus* (Sowerby, 1841).

PTERYNOTUS Swainson, 1837

Pterynotus Swainson, 1833, p. 22, pl. 100.

Genus characterized by three blade-like varices, varices foliated, no tooth on outer lip, weak intervaricial ribbing.

PTERYNOTUS TRIALATUS (Sowerby, 1841)
Pl. 3, figs. 1–3

Murex trialatus Sowerby, 1841, p. 143.

Hypotype.—Univ. of Calif. at Los Angeles, Invert. Paleo. Cat. No. 28999.

Type locality.—Southern California; Pleistocene and Recent. Living in waters from 12 to 24 degrees Centigrade.

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MANUSCRIPT RECEIVED MARCH 1, 1958

EXPLANATION OF PLATE 63

All figures ×1

FIGS. *1–3*—*Pterynotus trialatus* (Sowerby). UCLA Hypotype Cat. no. 28999. San Pedro, California; Recent.

4–7—*Ceratostoma foliata* (Gmelin). UCLA Hypotype Cat. no. 28997. Forrester Is., Alaska; Recent.

6—*Pterorhytis umbrifer* Conrad. Photograph of *P. umbrifer* Conrad in Monograph no. 8, Acad. Nat. Sci. Philad., pl. 35, fig. 2. A. Olsson and A. Harbison. Permission for reproducing figure here kindly granted by A. Olsson. Miocene of Virginia.

8–10—*Ceratostoma delorae* Hall. Stanford Univ. Paleo. Type Coll. Holotype no. 8473. Alameda Co., Calif.; Oursan sandstone, Middle Miocene.